

1 **DIRECT TESTIMONY OF**

2 **GEORGE A. LIPPARD III**

3 **ON BEHALF OF**

4 **SOUTH CAROLINA ELECTRIC & GAS COMPANY**

5 **DOCKET NO. 2010-2-E**

6
7 **Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND POSITION**
8 **WITHIN SOUTH CAROLINA ELECTRIC & GAS COMPANY (“SCE&G”**
9 **OR “COMPANY”).**

10 A. My name is George A. Lippard III. My business address is P.O. Box 88,
11 Jenkinsville, South Carolina. I am employed by SCE&G as the General Manager
12 of Nuclear Operations at the Virgil C. Summer Nuclear Station (“VCSNS” or
13 “V.C. Summer”).

14
15 **Q. DESCRIBE YOUR EDUCATIONAL BACKGROUND AND YOUR**
16 **BUSINESS EXPERIENCE.**

17 A. I earned a Bachelor of Science degree in Mechanical Engineering from
18 Clemson University in 1979 and a Master of Business Administration degree
19 from the University of South Carolina in 1982. I joined SCE&G in 1983 as a
20 Nuclear Training Instructor at VCSNS. I received a Senior Reactor Operator
21 Certification in 1986 and a Senior Reactor Operator License in 1992 from the
22 United States Nuclear Regulatory Commission (“NRC”). Since joining the

1 Company, I have held positions in the Operations, Outage Management,
2 Licensing, and Training organizations. Most recently, I served for over five years
3 as V.C. Summer's Operations Manager until I was promoted to General Manager
4 of Nuclear Operations at V.C. Summer Station in February 2010.

5
6 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

7 A. The purpose of my testimony is to review the operating performance of
8 VCSNS during the period from January 1, 2009 through December 31, 2009
9 ("Review Period").

10
11 **Q. WHAT ARE SCE&G'S OBJECTIVES IN THE OPERATION OF VCSNS?**

12 A. SCE&G's primary objective at VCSNS is safe and efficient operation. The
13 Company also strives for excellence in all phases of operation of the facility. The
14 station's key focus areas of SAFETY, reliability, outage and work management,
15 work force development, and organizational effectiveness constitute our core
16 business plan elements. SCE&G's constant improvement in these areas over the
17 years has facilitated VCSNS's outstanding service record. Furthermore, our
18 business objectives are focused on maintaining a competitive production cost for
19 the generation of electricity using nuclear fuel.

1 **Q. WHAT HAS BEEN THE COMPANY’S EXPERIENCE WITH THE**
2 **PERFORMANCE OF THE VCSNS?**

3 A. SCE&G continuously meets or exceeds all NRC requirements and Institute
4 of Nuclear Power Operations (“INPO”) standards. VCSNS has performed well
5 during the Review Period. Consistent with the provisions of Section 58-27-865
6 of the South Carolina Code of Laws, as amended, V.C. Summer’s net capacity
7 factor based on reasonable excludable nuclear system reductions during the
8 Review Period was 101.7%, and the gross generation output was 7,148,589
9 megawatt hours.

10
11 **Q. DID VCSNS EXPERIENCE ANY OUTAGES DURING THE REVIEW**
12 **PERIOD?**

13 A. Yes. During the Review Period, VCSNS experienced three outages—one
14 planned outage and two forced outages. After setting a continuous run record of
15 475 days, VCSNS experienced a forced outage on October 2, 2009 due to a
16 failure in the main generator breaker. The unit remained offline for almost 11
17 days, returning to service on October 13, 2009.

18 The unit began to reduce its generation output in a controlled manner on
19 October 16, 2009 and was shut down completely just after midnight on October
20 17, 2009 to conduct V.C. Summer’s 18th scheduled refueling outage (“RF18”).
21 This planned outage exceeded the estimated 43-day outage period by almost 12
22 days primarily due to repair of the Balance of Plant (“BOP”) switchgear, which

1 was damaged during the outage. VCSNS returned to service on December 10,
2 2009.

3 On December 16, 2009, VCSNS experienced another forced outage due to
4 a faulty main turbine control valve. The unit returned to service the following
5 day.

6
7 **Q. PLEASE DESCRIBE THE CIRCUMSTANCES LEADING TO THE**
8 **FORCED OUTAGE OF VCSNS ON OCTOBER 2, 2009.**

9 A. After a plant record of 475 days of continuous run, on the morning of
10 October 2, 2009, a failure in the main generator output breaker, which is located
11 on the non-nuclear side of the plant and helps tie the plant to the power grid,
12 caused a main generator stator ground. In response to the main generator stator
13 ground, a protective relay initiated a main turbine trip, which in-turn caused the
14 reactor at VCSNS to automatically shut down. The unit's response to the
15 shutdown was normal, and all systems responded as designed and required.

16
17 **Q. WHAT MEASURES WERE TAKEN TO RETURN THE UNIT TO**
18 **SERVICE?**

19 A. Upon examination, SCE&G discovered that the "B" phase contact of the
20 main generator output breaker was damaged. SCE&G replaced the damaged
21 breaker contact. Prior to placing the unit back into service, SCE&G tested the
22 new breaker, and SCE&G performed additional checks for potential system

1 grounds. All of these tests produced satisfactory results, and VCSNS returned to
2 service on October 13, 2009.

3
4 **Q. PLEASE EXPLAIN THE KEY WORK FUNCTIONS SCE&G**
5 **ACCOMPLISHED DURING THE REFUELING OUTAGE WHICH**
6 **BEGAN ON OCTOBER 17, 2009.**

7 A. During the refueling outage, approximately one-third of V.C. Summer's
8 157 fuel assemblies were replaced, and scheduled maintenance work that cannot
9 be performed when the plant is in operation was conducted. During this time,
10 over 3,000 routine tasks including preventative maintenance, corrective
11 maintenance, and surveillance testing tasks were completed successfully. More
12 specifically, SCE&G accomplished the following major tasks:

- 13 • **Replacement of the Main Power Transformer.** The existing main power
14 transformer was replaced with a new, more efficient main power
15 transformer equipped with self-diagnostic capabilities.
- 16 • **Reconfiguration of Coolant Flow in Reactor Vessel.** The Company
17 reconfigured the flow of coolant in the pressurized water reactor of VCSNS
18 from a downflow configuration to an upflow configuration to minimize the
19 effects of "baffle jetting," a hydraulic-induced instability or vibration of
20 fuel rods caused by the high velocity jet of water flowing through the
21 reactor. Although baffle jetting is quite common in nuclear reactors with a
22 downflow configuration, it can cause fuel rods to leak and disburse uranium

1 into the coolant. Reversing the flow of the coolant from a downflow
2 configuration to an upflow configuration is designed to prevent baffle
3 jetting by equalizing the differential hydraulic pressure within the core.

- 4 • **Upgrade of the Digital Rod Position Indication System (“DRPI**
5 **System”).** The DRPI System is a digital display system that provides the
6 control room operator with an indication of the position of the control rods
7 used to control the reactor. During Refueling Outage 17 in 2008, SCE&G
8 discovered that the DRPI System was not functioning properly and repaired
9 the system to fix the problem for the short term. As a long term solution,
10 SCE&G replaced the existing DRPI System with a new one during RF18.

- 11 • **Replacement of the Feedwater Regulating Valve Positioners.** The
12 Company replaced the existing feedwater regulating valve positioners with
13 redundant dual digital positioners. The replacement positioners represent a
14 technological upgrade and provide a back-up in case of a positioner failure.

15
16 **Q. PLEASE EXPLAIN THE PRIMARY REASON THAT RF18 LASTED**
17 **LONGER THAN EXPECTED.**

18 A. On November 22, 2009, after finishing the replacement of the main power
19 transformer, VCSNS closed a breaker in the switchyard to energize and warm up
20 the new main transformer. Grounds in the switchgear for the normal feeds had
21 been used to protect workers under a tag out during other prior maintenance
22 activities. These grounds remained in place when the breaker was closed to

1 energize the main transformer. The unremoved grounds resulted in a short
2 circuit, which caused an arc flash resulting in a small fire. SCE&G quickly
3 extinguished the fire, but it caused damage in one cubicle of each of the three
4 BOP switchgear which required repair.

5
6 **Q. PLEASE DESCRIBE THE CAUSE OF THE FORCED OUTAGE OF**
7 **VCSNS ON DECEMBER 16, 2009.**

8 A. On December 10, 2009, VCSNS returned to service from RF18. Around
9 midnight on December 13, the unit had reached 95% power when a vibration was
10 noted in the pipes which supply hydraulic fluid to position the main turbine
11 control valves. To stop the vibration, SCE&G lowered the power level of the
12 reactor to 80%. On December 16, 2009, the Company decided to ramp the power
13 level down to 40%. At this power level, the Company could manually trip the
14 turbine offline and repair the faulty turbine control valve, but leave the reactor in
15 critical mode. In critical mode, the reactor continues to generate heat, which
16 produces steam; rather than being sent to turbine to generate electricity, the steam
17 is sent to the condenser via the Steam Dump System ("SDS"). After the manual
18 turbine trip, however, the SDS failed to operate, forcing the Company to
19 manually trip the reactor. The Company then replaced the part of the main
20 turbine control valve that had caused the original vibration as well as an
21 electronic card that caused the SDS failure, and VCSNS returned to service on
22 December 17, 2009.

1 **Q. WHEN WILL THE NEXT REFUELING OUTAGE OCCUR?**

2 A. Refueling outages are scheduled every 18 months to replace depleted fuel
3 assemblies. Maintenance and testing that cannot be done with the plant on-line
4 are also conducted during the refueling outage. SCE&G's next refueling outage,
5 Refueling Outage No. 19, is scheduled for April 2011.

6
7 **Q. PLEASE EXPLAIN THE ROLES OF INPO AND THE NRC WITHIN THE**
8 **NUCLEAR INDUSTRY AND DESCRIBE ANY RANKINGS RECEIVED**
9 **BY VCSNS FROM THOSE AGENCIES.**

10 A. INPO is a nonprofit corporation established by the nuclear industry to
11 promote the highest levels of nuclear safety and plant reliability. INPO promotes
12 excellence in the industry in the operation of nuclear electric generating plants.
13 For the applicable reporting period, INPO rated VCSNS's overall performance as
14 exemplary which is the highest rating awarded.

15 The NRC is responsible for the licensing and oversight of the civilian use
16 of nuclear materials in the United States. The NRC has reported that VCSNS
17 operated in a manner that preserved public health and safety and fully met all
18 cornerstone objectives. During the reporting period, the NRC implemented no
19 supplemental inspections beyond the base inspection scope.

1 **Q. WHAT IS THE SPENT FUEL STORAGE CAPABILITY FOR VCSNS**
2 **AND WHAT IS THE PLAN FOR DEVELOPMENT OF A DRY FUEL**
3 **STORAGE FACILITY?**

4 A. V.C. Summer has sufficient capacity for spent fuel storage in the spent fuel
5 pool through the 23rd refueling outage in 2017. This allows capacity for a full
6 core off-load in addition to the spent fuel stored in the pool. The plant is already
7 developing plans for the construction of a dry fuel storage facility that will need
8 to be in service by 2015.

9

10 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

11 A. Yes.